

What is claimed is:

1. An electronic data transmission and reception system comprising:

n first through nth (n is an integer of 2 or greater) apparatus connected to a network;

5 a transmitting apparatus connected to said network for transmitting first electronic data to said first apparatus; and

a receiving apparatus connected to said network for receiving (n+1)th electronic data from said nth apparatus;

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an arrangement being such that a jth (j is an integer satisfying  $1 \leq j \leq n$ ) apparatus generates (j+1)th electronic data which comprise jth electronic data with a signature assigned thereto for identifying said jth apparatus, and transmits the (j+1) electronic data to a

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(j+1)th apparatus, and when said j is said n, an (n+1)th apparatus corresponds to said receiving apparatus.

2. An electronic data transmission and reception system according to claim 1, wherein said transmitting apparatus transmits said first electronic data and a sender authenticator which authenticates a transmission of

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said first electronic data, to said first apparatus; and

said first apparatus generates second electronic data which comprise said first electronic data and said sender authenticator with a signature of said first apparatus assigned thereto, and transmits said second  
10 electronic data to a second apparatus.

3. An electronic data transmission and reception system according to claim 2, further comprising:

a memory apparatus for use with said transmitting apparatus;

5 wherein said first apparatus generates transmission proof data which comprise said first electronic data and said sender authenticator with the signature of said first apparatus assigned thereto, and transmits said transmission proof data to said transmitting apparatus;  
10 and

said transmitting apparatus stores the transmission proof data transmitted from said first apparatus into said memory apparatus for use with said transmitting apparatus.

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4. An electronic data transmission and reception system according to claim 2, wherein said nth apparatus transmits a notification of a reception of nth electronic data to said receiving apparatus when said nth ap-

5     paratus receives said nth electronic data from an (n-1)th  
apparatus;

          said receiving apparatus transmits a receiver  
authenticator which authenticates the reception of said  
nth electronic data in response to the notification of the  
10    reception of nth electronic data; and

          said nth apparatus generates (n+1)th electronic  
data which comprise said nth electronic data and said re-  
ceiver authenticator with a signature of the nth apparatus  
assigned thereto, and transmits said (n+1)th electronic  
15    data to said receiving apparatus.

5. An electronic data transmission and recep-  
tion system according to claim 3, wherein said nth appa-  
rus transmits a notification of a reception of nth elec-  
tronic data to said receiving apparatus when said nth ap-  
5    paratus receives said nth electronic data from an (n-1)th  
apparatus;

          said receiving apparatus transmits a receiver  
authenticator which authenticates the reception of said  
nth electronic data in response to the notification of the  
10    reception of nth electronic data; and

          said nth apparatus generates (n+1)th electronic  
data which comprise said nth electronic data and said re-  
ceiver authenticator with a signature of the nth apparatus

assigned thereto, and transmits said (n+1)th electronic  
15 data to said receiving apparatus.

6. An electronic data transmission and reception system according to claim 4, further comprising:

a memory apparatus for use with said receiving apparatus;

5 wherein said receiving apparatus stores said (n+1)th electronic data transmitted from said nth apparatus, into said memory apparatus for use with said receiving apparatus.

7. An electronic data transmission and reception system according to claim 5, further comprising:

a memory apparatus for use with said receiving apparatus;

5 wherein said receiving apparatus stores said (n+1)th electronic data transmitted from said nth apparatus, into said memory apparatus for use with said receiving apparatus.

8. An electronic data transmission and reception system according to claim 4, wherein said receiving apparatus comprises:

a database of said receiving apparatus for  
5 storing said sender authenticator and signatures of said n  
apparatus; and

wherein said receiving apparatus:

fetches said nth electronic data and said re-  
ceiver authenticator except the signature of said nth ap-  
10 paratus assigned to said (n+1)th electronic data;

fetches said jth electronic data except the  
signature assigned to said (j+1)th electronic data other  
than said (n+1)th electronic data and said second elec-  
tronic data;

15 fetches said first electronic data and said  
sender authenticator except the signature of said first  
apparatus assigned to said second electronic data; and

refers to said database of said receiving appa-  
ratus for recognizing that said transmitting apparatus has  
20 transmitted said first electronic data.

9. An electronic data transmission and recep-  
tion system according to claim 6, wherein said receiving  
apparatus comprises:

a database of said receiving apparatus for  
5 storing said sender authenticator and signatures of said n  
apparatus; and

wherein said receiving apparatus:

fetches said nth electronic data and said receiver authenticator except the signature of said nth apparatus assigned to said (n+1)th electronic data;

fetches said jth electronic data except the signature assigned to said (j+1)th electronic data other than said (n+1)th electronic data and said second electronic data;

fetches said first electronic data and said sender authenticator except the signature of said first apparatus assigned to said second electronic data; and

refers to said database of said receiving apparatus for recognizing that said transmitting apparatus has transmitted said first electronic data.

10. An electronic data transmission and reception system according to claim 8, wherein said first apparatus generates said second electronic data in which the signature of said first apparatus is assigned to a first time stamp that represents the time when said first apparatus receives said sender authenticator from said transmitting apparatus;

said nth apparatus generates said (n+1)th electronic data in which the signature of said nth apparatus is assigned to a second time stamp that represents the

time when said nth apparatus receives said receiver authenticator from said receiving apparatus; and

wherein said receiving apparatus fetches said nth electronic data, said receiver authenticator, and said  
15 second time stamp except the signature of said nth apparatus assigned to said (n+1)th electronic data; and

fetches said first electronic data, said sender authenticator, and said first time stamp except the signature of said first apparatus assigned to said second electronic data.  
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11. An electronic data transmission and reception system according to claim 9, wherein said first apparatus generates said second electronic data in which the signature of said first apparatus is assigned to a first  
5 time stamp that represents the time when said first apparatus receives said sender authenticator from said transmitting apparatus;

said nth apparatus generates said (n+1)th electronic data in which the signature of said nth apparatus  
10 is assigned to a second time stamp that represents the time when said nth apparatus receives said receiver authenticator from said receiving apparatus; and

wherein said receiving apparatus fetches said nth electronic data, said receiver authenticator, and said

15 second time stamp except the signature of said nth apparatus assigned to said (n+1)th electronic data; and

fetches said first electronic data, said sender authenticator, and said first time stamp except the signature of said first apparatus assigned to said second electronic data.  
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12. An electronic data transmission and reception system according to claim 4, wherein said nth apparatus generates reception proof data which are electronic data comprising said nth electronic data and said receiver authenticator with the signature of said nth apparatus assigned thereto.  
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13. An electronic data transmission and reception system according to claim 12, wherein said transmitting apparatus comprises:

a database of said transmitting apparatus for storing signatures of said n apparatus and said receiver authenticator; and  
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wherein said transmitting apparatus:

fetches said nth electronic data and said receiver authenticator except the signature of said nth apparatus assigned to said reception proof data;  
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fetches said jth electronic data except the signature assigned to said (j+1)th electronic data other than said reception proof data and said second electronic data;

15                fetches said first electronic data and said sender authenticator except the signature of said first apparatus assigned to said second electronic data; and  
                  refers to said database of said transmitting apparatus for recognizing that said first electronic data  
20   have been transmitted to said receiving apparatus.

14. An electronic data transmission and reception system according to claim 13, further comprising:

                  a first electronic data memory apparatus;  
                  wherein said transmitting apparatus:

5                stores said first electronic data into said first electronic data memory apparatus before transmitting said first electronic data; and

                  when said transmitting apparatus fetches said first electronic data, said transmitting apparatus refers  
10   to said first electronic data memory apparatus to recognize that said first electronic data have been transmitted to said receiving apparatus without being falsified.

15. An electronic data transmission and reception system according to claim 14, wherein said nth apparatus generates reception proof data which are electronic data comprising said nth electronic data and said receiver authenticator with the signature of said nth apparatus assigned thereto, and transmits said reception proof data from which said first electronic data have been deleted, to said transmitting apparatus; and

wherein said transmitting apparatus adds said first electronic data stored in said first electronic data memory apparatus to said reception proof data transmitted from said nth apparatus, thereby restoring said reception proof data.

16. An electronic data transmission and reception system according to claim 13, wherein said first apparatus generates said second electronic data in which the signature of said first apparatus is assigned to a first time stamp that represents a time when said first apparatus receives said sender authenticator from said transmitting apparatus;

said nth apparatus generates said reception proof data in which the signature of said nth apparatus is assigned to a second time stamp that represents a time

when said nth apparatus receives said receiver authenticator from said receiving apparatus; and

wherein said transmitting apparatus:

fetches said nth electronic data, said receiver authenticator, and said second time stamp except the signature of said nth apparatus assigned to said reception proof data; and

fetches said first electronic data, said sender authenticator, and said first time stamp except the signature of said first apparatus assigned to said second electronic data.

17. An electronic data transmission and reception system according to claim 15, wherein said first apparatus generates said second electronic data in which the signature of said first apparatus is assigned to a first time stamp that represents a time when said first apparatus receives said sender authenticator from said transmitting apparatus;

said nth apparatus generates said reception proof data in which the signature of said nth apparatus is assigned to a second time stamp that represents a time when said nth apparatus receives said receiver authenticator from said receiving apparatus; and

wherein said transmitting apparatus:

fetches said nth electronic data, said receiver  
15 authenticator, and said second time stamp except the signature of said nth apparatus assigned to said reception proof data; and

fetches said first electronic data, said sender authenticator, and said first time stamp except the signature of said first apparatus assigned to said second electronic data.  
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